REMARKS

Claims 1, 3, 6-8, 10 and 13-14 are pending in this application. For purposes of expedition, claims 4-5, 11-12 and 15, as previously withdrawn due to a Restriction Requirement, have been canceled without prejudice or disclaimer. Likewise, claim 9 has been canceled without prejudice or disclaimer. Claims 1, 6, 8 and 13-14 have been amended in several particulars for purposes of clarity and brevity in accordance with current Office policy, to further define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application.

Claims 1, 3, 6-10 and 13-14 have been rejected under 35 U.S.C. §112, 1st ¶, as failing to comply with the written description requirement. Specifically, the Examiner asserts that the specification fails to support the limitation "transversely moving the mask relative to the substrate by a translation distance" as defined in claims 1 and 6. According to the Examiner, paragraph [0024] of the specification only describes that the "amorphous silicon and crystalline silicon are melted by moving a mask through stages of movement." However, when the mask is moved across the surface of a substrate for crystallization, it is said to have transversed (i.e., crossed from side to side) the substrate. The translation distance is nothing more than a distance in which the mask moves from side to side of the substrate, which corresponds to a width of an overlapping region on the substrate during crystallization. Moreover, paragraph [0024] of the specification is not the only paragraph in the specification that describes the way in which amorphous silicon is crystallized into polycrystalline silicon by way of sequential lateral solidification (SLS). The entire Background Section of Applicants' specification describes the sequential lateral solidification (SLS) crystallization technology and the inability of existing manufacturing techniques to manufacture grains having grain width of a certain size. In any event, for purposes of expedition, claims 1, 6 and 13 have been amended to delete reference to the adjective "translation" in order to overcome the rejection.

Claims 1, 3 and 13-14 have been rejected under 35 U.S.C. §102(b) as being anticipated by Jung, U.S. Patent No. 6,825,493, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over the same Jung, U.S. Patent No. 6,825,493 for reasons stated on pages 3-5 of the Office Action. In support of this rejection, the Examiner cites column 9, lines 45-67; column 10, lines 25-45; and column 14, lines 1-25 of Jung '493 for allegedly disclosing all features of

base claims 1 and 13.

However, the Examiner's citation is misplaced. No where in Jung '493 is there any disclosure of Applicants' claimed "a width of the overlapping region during crystallization corresponds to the distance, and is varied from no less than 0.5 μm to 2 μm," and "the average width of the polycrystalline silicon grains is varied between approximately 0.2 μm and 0.6 μm, and is decreased when the width of the overlapping region on which the laser beam is overlappingly irradiated is decreased" as defined in base claims 1 and 13.

As discussed in paragraph [0009] of Applicants' specification, the problem as identified by Applicants relates to the deterioration of the mobility of an electric field by a scattering effect during charge transfer if an average width of the polycrystalline silicon grains is small. As a result, polycrystalline silicon grains having an average width of a certain size is important, and is required to obtain superior current characteristics. These problems are remedied by Applicants' sole recognition that, if a laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed, and a width of the overlapping region during crystallization is varied between 0.5 μm and 2 μm, the **most effective width of polycrystalline silicon grains, that is, from 0.2 μm and 0.6 μm**, can be advantageously obtained.

In contrast to Applicants' base claims 1 and 13, as amended, Jung '493 discloses only a conventional sequential lateral solidification (SLC) crystallization method in which a substrate 38, as shown in FIG. 2, is typically moved numerous times such that crystallization is repeated until the mask moves the distance between adjacent light transmitting portions so as to form grains of different sizes.

According to Jung '493, there are only two embodiments disclosed in FIGs. 6A-6D and FIGs. 7A-7D. In the first embodiment shown in FIGs. 6A-6D, when the mask 130 moves along the lateral grain growth of the grains (see FIG. 6A) in a X-direction by a distance of about 0.7 micrometers (see column 9, lines 54-55 of Jung '493), the polycrystalline silicon grains will exhibit a width "P" of 12 micrometers (see column 10, lines 8-10 of Jung '493). In the second embodiment shown in FIGs. 7A-7D, when the mask 130 moves in a X-direction by a distance of about 1.7 micrometers (see column 10, lines 40-41 of Jung '493), the resulting grains will exhibit a width of 1.7 micrometers (see column 10, lines 64-65 of Jung '493). In the second embodiment shown in FIGs. 7A-7D, grains are provided with grain sizes of 1.7 micrometers.

Nevertheless, on page 4 of the Office Action, the Examiner makes several assertions that are either misplaced or factually flawed. For example, the Examiner asserts that Jung '493 teaches

> "silicon grains have a width of 12 micrometers (col. 10, ln 1-15) and have a grain width of 1.7 micrometers when the overlap is decreased (col. 10, ln 1-65)."

However, the Examiner's assertion does **not** anticipate or render obvious Applicants' claimed "average width of the polycrystalline silicon grains is varied between approximately **0.2 μm and 0.6 μm**, and is decreased when the width of the overlapping region on which the laser beam is overlappingly irradiated is decreased" as defined in base claims 1 and 13.

In addition, the Examiner further asserts that Jung '493 teaches

> "decreasing the width of the overlap, thus the average width of the grains will decrease because applicant's teach decreasing the overlap, note paragraph [0028] of the original specification."

However, no where in Jung '493 is there such a disclosure. Moreover, the Examiner appears to use Applicants' specification against features of Applicants' base claims 1 and 13.

Again, and as previously discussed, there is **no** disclosure from Jung '493 nor is there any teaching or suggestion of the Applicants' claimed "transversely moving the mask relative to the substrate by a translation distance such that the laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed so as to increase an average width of the polycrystalline silicon grains," such that, when "a width of the overlapping region during crystallization corresponds to the translation distance, and is varied from no less than 0.5 μm to 2 μm", "an average width of the polycrystalline silicon grains is varied between approximately 0.2 μm and 0.6 μm, and is decreased when the width of the overlapping region on which the laser beam is overlappingly irradiated is decreased" as expressly defined in base claims 1 and 13. In addition, Jung '493 does **not** disclose or suggest the distinction between the light transmission portion and the light non-transmission portion of the mask as defined in base claim 13.

Since Jung '493 fails to disclose and suggest key features of Applicants' base claims 1

and 13, Applicants respectfully request that the rejection of claims 1, 3 and 13-14 be withdrawn.

Lastly, claims 6-10 have been rejected under 35 U.S.C. §103 as being unpatentable over Jung, U.S. Patent No. 6,825,493 and further in view of Yang, U.S. Publication No. 2002/0197759 for reasons stated on pages 5-7 of the Office Action. For reasons discussed previously, Jung '493 does **not** disclose or suggest features of Applicants' base claims 1 and 13. Moreover, Yang, U.S. Patent Application Publication No. 2002/0197759, as a secondary reference, does not disclose or suggest what the Examiner alleges, that is, the use of a mask provided with at least a light transmission region for passing a laser beam and a laser non-transmission region for blocking the laser beam, wherein the laser transmission region is wider than the laser non-transmission region by more than 1 μm, as defined in base claim 6.

In contrast to Applicants' base claim 6, Yang '759 only discloses the use of a completely different mask 100, as shown in FIG. 8, in which two different types of light transmission regions L and M are utilized, each having a tiered echelon formation outline. Namely, as described in paragraph [0067] of Yang '759, the light transmission regions L and M have tier-shaped top and bottom outlines. Each of first light transmission regions L is comprised of first to fourth rectangular-shaped patterns, all having the same width. The second light transmission region M, located between the first light transmission regions L, has rectangular-shaped patterns M1 and M2.

Again, the mask 100 as disclosed by Yang '759 is very different from the mask as defined by Applicants' base claim 6, in which the laser transmission region is wider than the laser non-transmission region by more than 1 μm. In view of these distinctions, Applicants respectfully request that the rejection of claims 6-10 be withdrawn.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC office at (202) 216-9505 ext. 232.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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